

REMARKS**I. Drawing Objection and Changes**

The drawing figures 1 and 2 were objected to for not illustrating several features of the claimed invention, such as the fibers in the coating that is fiber-reinforced and steps of the claimed method. In addition the openings through the coating of claims 3 to 5, the variable wall thickness for the coating, the coating made of multiple layers and the coating made with several different reactively cross-linkable plastics were not illustrated in the drawing.

The original claims 1 to 19 were canceled, but the new claims 20 to 38 include the same features that were not previously illustrated. In addition new claims have been added for an embodiment that has been previously not claimed but is disclosed in the specification. This embodiment is a plastic coated thermolabile plastic inlet (new fig 5). In other words a plastic bottle provided with a plastic coating 4 by the RIM method (page 8, line 18, original specification).

Figures 1 and 2 have been replaced with replacement figures that include many additional drawing reference numbers to illustrate features of the coated containers recited in the claims. New figures 3 to 6 have been added to illustrate the claimed containers and method. Figure 3 shows an embodiment including the through-going openings in the coating, which were claimed in claims 3 to 5.

Figure 4 shows several embodiments to reduce the total number of figures.

These latter embodiments include an embodiment in which two different plastic

coatings are provided in different regions or sections of the container; an embodiment in which a two layer plastic coating is provided on the body of the container and embodiments with coatings in different regions of different thickness. Fig. 6 shows a step in the method of making the plastic coated containers.

Also in the replacement figures and in the new figures the proper type of cross-hatching in accordance with M.P.E.P. 608.02 and 37 C.F.R. 1.84 (n) has been used for plastic materials and glass (transparent material).

In view of the additions and changes made to obtain the replacement figures 1 to 2 and the new figures 4 to 6, withdrawal of the objection to the drawing under 37 C.F.R. 1.83 (a) is respectfully requested.

II. Specification Objection and Changes

The disclosure was objected to because of a lack of a "Brief Description of the Drawing" and a lack of proper section headings. There were also references to claims by number.

In addition, several important terms were mistranslated, which will be discussed in more detail below in connection with the rejections based on 35 U.S.C. 112, first and second paragraph. Furthermore there were missing words in the translation and grammatical and other errors.

A substitute specification has been prepared to correct the numerous wording errors in the original specification, to supply the "Brief Description of the Drawing" and to include the recommended section headings. Also grammatical

errors and other translation errors have been corrected. The substitute specification appears above.

Also the additional features in the new figures and replacement figures were added to the "detailed description" section in the specification. These additions are not new matter because they were described in the dependent claims and in the "summary of invention" section.

In addition, a marked-up copy of the original specification showing the changes that were made to obtain the above substitute specification accompanies this amendment in accordance with M.P.E.P. 608.01 (q). The substitute specification is warranted to contain no "new matter".

In view of the filing of the substitute specification with the numerous changes, the brief description of the drawing and the section headings, withdrawal of the objection to the specification is respectfully requested.

III. Rejection under 35 U.S.C. 112, first paragraph

Claims 1 to 19 were rejected under 35 U.S.C. 112, first paragraph. These claims were rejected for being based on a specification that does not enable one skilled in the art to make and/or use the claimed invention.

However new claims 20 to 38 have been added and claims 1 to 19 have been canceled. The new claims contain similar subject matter to the canceled claims, but mistranslations of chemical terms have been corrected.

Specifically the term "reactively-vulcanized plastic" was objected to. This term is not used in new claims 20 to 38 because it was the result of an incorrect

translation of the German term "reaktiv vernetzender Kunststoff". The correct term in English is "reactively cross-linkable or cross-linking plastic". The English language abstract provided with the copy of the PCT International application that was received from the International Bureau shows that this latter term is correct.

In addition, the term "container sheathing" on page 12 of the originally filed English translation is an inappropriate translation. This term is an English translation of the German term "Behältermantel". The German-English Technical and Engineering Dictionary by L. DeVries, et al, 2nd Edition, 1966 gives the appropriate translation of this term under the entry for "mantel" as "container wall". The term "sheathing" is appropriate for an outer jacket of a cable or perhaps for the plastic coating on the small glass bottle or "glass inlet" but not for a container wall.

The term "thermosetting resins" on page 11, line 27, of the originally filed specification was also a mistranslation. The correct term is "reactive resins". Thermosetting resins of the prior art are not to be used to make the plastic coating of the invention (see paragraph 5 of the background section of the specification).

Also other minor changes in terminology were made, which are not "new matter". The words that were missing in the English translation of the specification on page 3 were due to the fact that a sentence was cut off from that page supplied to the translator due to a copying error. The complete official copy of the PCT publication (which was provided to the U.S.P.T.O. by the International

Bureau) however provided the complete German language sentence so that an appropriate translation could be made.

For the foregoing reasons it is respectfully submitted that the substitute specification provides an adequate basis for one skilled in the art to make and/or use the claimed containers of new claims 20 to 32 and the claimed method of new claims 33 to 38.

Because of the changes in the specification and claims it is respectfully submitted that new claims 20 to 38 should not be rejected under 35 U.S.C. 112, first paragraph.

IV. Rejection under 35 U.S.C. 112, second paragraph

Claims 12 and 15 to 19 were rejected under 35 U.S.C. 112, second paragraph, for indefiniteness.

Claim 12 was rejected because the alternative wording appeared to claim different embodiments in the same claim. New claim 30 includes subject matter from canceled claim 12 but is not in alternative form and claims a single embodiment.

Method claims 15 to 19 have been canceled and new method claims 33 to 38 have been added. The new method claims include different subject matter. The first step of the canceled method claim 15 was the step of making the conventional glass inlet or bottle by entirely prior art means. Since it is not an inventive step, this step has not been included in the new method claim 33. The new step a) is based on the disclosure in the originally filed specification on page

8, lines 5 to 9. This paragraph discloses injection of a reactively cross-linkable plastic into a mold -- at the comparatively low pressures of 10 bar. The particular pressure range is claimed in new claim 34.

The terminology "reaction injection molding" used in claim 33, step b, refers to a particular well known, but comparatively recent, injection molding technique that is designated the "RIM" method in the prior art. For example, Gaudreau, U.S. Patent 4,562,032, which is in the prior art of record for the above-identified application, cites the RIM method in column 3, lines 30 to 37. The RIM method is a general injection molding technique that can be used to mold different articles besides the claimed closeable containers. Gaudrean cites U.S. Patent No. 4,426,348 as describing the RIM method. A copy of this latter reference is being provided together with an information disclosure statement.

Step b) limits the injection molding method used to provide the plastic coating to the RIM system. This is an important limitation as explained in applicants' summary of invention and in the background section.

In any case it should be clear that claim 33 claims a method and not a product-by-process claim or some other class of claim.

New claim 37 claims particular values of the coating and container wall thickness of the glass inlets that can be employed in the method, which are surprising in view of the art based on similar molding methods using thermosetting resins. The comparatively low molding pressures and temperatures of the special reaction injection molding (RIM) methods make it possible to apply the method to both glass and plastic containers with

surprisingly thin walls. Claim 38 also claims structural details of glass inlets that can be employed in the method.

For the foregoing reasons it is respectfully submitted that none of the new 30 and claims 33 to 38 should be rejected under 35 U.S.C. 112, second paragraph, for indefiniteness, for the reasons in the Office Action.

V. New Abstract

A new abstract complying with U.S. Patent Office Guidelines and Rules has been provided.

VI. Rejection of Container Claims based on Wallace

Claims 1 and 6 were rejected under 35 U.S.C. 102 (b) as anticipated by, or in the alternative, under 35 U.S.C. 103 (a) as obvious from Wallace.

Claims 1 and 6 have been canceled, but new claims 20 and 25 contain the subject matter of canceled claims 1 and 6.

Wallace discloses a casting method for forming a plastic coating comprising polyurethane (claim 3) around a single walled container (claim 1). The single-walled container can be a glass container (column 2, line 9). This casting method is of course entirely different from an injection molding technique that utilizes comparatively high pressures and temperatures for the material that is injected to the mold. In order to provide the container with the plastic coating according to Wallace a liquid mixture of a foamable plastic material, containing e.g. as polyurethane prepolymer materials, and water (claims 2 to 4) are injected

into the mold.

However applicants understand that process limitations cannot be used to patentably distinguish an article or composition claim without showing or proving that the process limitations produce real structural or composition differences in the claimed invention.

Applicants' claim a closeable container in claim 1 having a plastic coating comprising "at least one reactively cross-linkable plastic". The coating is formed by injection molding using the RIM system. Wallace, in contrast, does not disclose that the plastic coating includes a "reactively cross-linkable plastic". In order to be "cross-linkable" that plastic material introduced to the mold in the case of Wallace must include a cross-linking agent or cross-linker. The cross-linker is especially beneficial it helps because form a durable hard coating at lower temperatures and pressures than would otherwise be possible.

The reaction injection molding or RIM system is a known injection molding technique that permits the use of comparatively lower temperatures and pressures than in the case of the typical injection molding techniques using thermosetting resins. Gaudreau, which is part of the prior art of record but is in a different field of art from the claimed invention (as evidenced by the classification numbers), discloses a method of making padded-safety trim components for automobiles using the reaction injection molding method with polyurethane compositions. Gaudreau cites U.S. Patent 4,426,348 as describing the features of the reaction injection molding method in column 3, lines 30 to 36. A copy of Salisbury is being filed with an information disclosure statement.

The reaction injection molding method in accordance with Salisbury requires the use of a cross-linker or cross-linking agent, for example, aromatic polyamines (footnote 4 of Table I of Salisbury) together with polyurethane prepolymer compounds. Because the RIM system includes the cross-linker and also a chain extender (claim 1 of Salisbury), the resulting plastic coating of applicants' claims 20 and 25 clearly has a different composition from the composition of the coating formed according to Wallace by the casting method.

Applicants' claimed injection molding methods are limited to the reaction injection molding method (RIM). Claim 1 excludes coatings made with casting methods and with injection molding techniques using thermosetting resins.

A reference that is used to reject a claimed invention as anticipated must disclose each and every feature of the claimed invention. The plastic coating of Wallace does not include a cross-linking agent or cross-linker or alternatively is not a reactively cross-linkable plastic composition. Thus the article claimed in claims 20 and 25 has a plastic coating that has a significantly different composition with different properties than the polyurethane containing coating of Wallace.

Furthermore the casting composition of Wallace does not provide a hint or suggestion of the plastic or polyurethane compositions of the RIM injection molding technique that must include cross-linking agent and chain extender. *In order to reject a claimed article under 35 U.S.C. 103 (a) based on a single reference there must be some hint or suggestion of the modifications of the subject matter of the reference that are necessary to arrive at the claimed*

Invention. See M.P.E.P. Chap 21, about 2145

Other differences include the following: Wallace includes water in the composition injected into the casting mold to make the plastic coating in his case. Water is not part of the injected composition in the RIM system, as disclosed in Salisbury. Also the composition of Wallace is a foamed polyurethane composition.

For the foregoing reasons and because of the features of the new article claims 20 and 25 it is respectfully submitted that claims 20 and 25 should not be rejected under 35 U.S.C. 103 (a) over the prior art, including Wallace.

VII. Rejection of Dependent Container Claims as Obvious

Claims 2, 9, 10, 12, 13 and 14 were rejected as obvious over Wallace in view of Sturm and Bridges.

Claims 3 to 5 were rejected as obvious over Wallace in view of Bleile, et al.

Claim 7 was rejected as obvious over Wallace in view of Manni.

The features of these canceled dependent claims have been included in the new dependent claims. These features themselves or their combination with the features of new claim 20 are not currently being relied on to establish the patentability of the applicants' claimed container. They are features of preferred embodiments.

Sturm and Bridges and/or Bleile and/or Manni however do not suggest making a plastic coated glass or plastic container by the advantageous RIM

injection molding methods using a reactively cross-linkable plastic instead of by injection molding methods that utilize comparatively higher pressures and temperatures and thermosetting resins. Applicants' do not employ conventional thermosetting resins.

Sturm and Bridges and/or Bleile and/or Manni do not suggest a plastic coating that comprises a reactively cross-linkable plastic as claimed in applicants' claim 20. The RIM or reaction injection molding technique requires this type of cross-linkable plastic material so that comparatively low temperatures and low pressures can be used in the injection molding technique. As a result, glass inlets with lower wall thickness can be coated by injection molding without considerable waste due to breakage.

It is well established by many U. S. Court decisions that to reject a claimed invention under 35 U.S.C. 103 there must be some hint or suggestion in the prior art of the modifications of the disclosure in a prior art reference or references used to reject the claimed invention, which are necessary to arrive at the claimed invention. For example, the Court of Appeals for the Federal Circuit has said:

"Rather, to establish obviousness based on a combination of elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant...Even when obviousness is based on as single reference there must be a showing of a suggestion of motivation to modify the teachings of that reference." *In re Kotzab*, 55 U.S.P.Q. 2nd 1313 (Fed. Cir. 2000). See also M.P.E.P. 2141

For the foregoing reasons and because of the changes in the main

container claim, it is respectfully submitted that none of the claimed container claims 20 to 32 should be rejected under 35 U.S.C. 103 (a) based on a combination of Wallace with Sturm and Bridges or with Bleile or with Manni.

VIII. New Method Claims 33 to 38

The prior art of record does not disclose or suggest the advantageous method of making containers coated with plastic, especially glass inlets that are pressurized internally and used for medicinal purposes. Because of the lower temperatures and pressures used in the reaction injection molding method as claimed in claims 33 to 38, glass inlets with thinner walls can be coated with plastic in an advantageous manner with less breakage and waste than with prior art injection molding techniques using thermosetting resins.

Allowance of the new method claims 33 to 38 is respectfully solicited.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Any costs involved should be charged to the deposit account of the undersigned (No. 19-4675). Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael D. Striker", with a long horizontal flourish extending to the right.

Michael D. Striker,
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: S. A. WEAVER; Art Unit: 3727; Docket No.: 1978

In RE: Application of Martin SOMMER, et al
Ser. No: 10/069,645
Filed: May 14, 2002

**MARKED-UP COPY OF ORIGINALLY FILED SPECIFICATION
FILED UNDER M.P.E.P. 608.01 (Q)
IN SUPPORT OF SUBSTITUTE SPECIFICATION**

Hon. Commissioner of Patents
and Trademarks,
Washington, D. C. 20231

Sir:

In response to the Office Action dated September 23, 2003, please accept the following marked-up copy of the originally filed specification showing the changes made to obtain the substitute specification filed in the accompanying amendment:

In the Specification:

The following is the marked-up copy of the originally filed specification showing the changes made to obtain the **substitute specification**, which is warranted to contain no new matter:

BACKGROUND OF THE INVENTION**1. Field of the Invention**

1 The invention relates to ~~is based on~~ a closeable glass container, especially a glass bottle or glass inlet, comprising a plastic coating applied by injection molding and also to an injection molding method of applying it according to the features of the preamble of Claim 1.

~~The invention is further based on a method for the production of the container comprising a coating applied by injection molding.~~

2. Description of the Related Art

2 Glass containers of this type comprising a coating applied by injection molding are used for medical purposes in particular, but they are also used for cosmetic purposes or to store food and beverages. The purpose of these plastic coatings, for example, is to hold glass splinters together if the coated glass container breaks. The plastic coating therefore also serves to provide protection against bursting and/or shattering.

3 Glass containers of various species comprising a plastic coating applied in different fashions using the most diverse types of plastics have been made known in numerous publications.

4 In DE-OS 24 31 952 it was made known to coat glass bottles with a plastic that comprises a thermosetting resin that is softened before use, either by means of internal plasticizers, i.e., by means of substances that react during production of the thermosetting plastic and thereby become part of the resin, or by means of external plasticizers that are added to the finished resin in suitable fashion. The softened, thermosetting resin is available as coating powder, is ground to a specified particle size, and then applied electrostatically to the bottles. The application of the powder can also take place by means of immersion in a fluidized bed or in an electrostatic fluidized bed. The applied layer is then cured, preferably in an infrared oven. In this known case, the coating of the bottles therefore takes place using the method of powder coating on a thermosetting basis. This method ~~that does not permit exact shaping allow for an exact contour of the coated bottle comprising a coating applied by injection molding, as required, for example, to shape the base section with regard for the stability of the glass bottle, and which is also relatively costly.~~

5 Furthermore, the softened thermosetting resin cannot be applied to the glass bottles using the technique of injection molding, because this technique requires that a plastic molding compound be available that can be softened under the influence of heat, so that it can then be pressed into the molding die. By definition, thermosetting plastics are not capable of being heat-softened, however.

6 To the extent that glass containers have been put into concrete terms in the publications about the related art, containers such as beer bottles, mineral water bottles, cosmetic containers and the like are typically named. Additionally,

the ~~principles~~principle of coating glass containers by injection molding are ~~is~~ also used with a special species of containers, namely closeable medical containers subject to a relatively high pressure. ~~pressure, especially pressure~~ These pressurizable medical containers ~~than~~ can be filled under pressure with medically effective substances and a propellant. ~~propellant, and the~~ These containers have an opening of which is closeable using a delivery element, in particular a metering valve. ~~In conjunction with a~~ A dispensing head is provided that interacts with the delivery element in such a fashion that the delivery element is actuated when both parts are pressed together. A ~~and a~~ certain quantity of the medically effective substance is then released through a spray opening as an aerosol. ~~These aerosol, these~~ products serve as applicators for medical applications, in particular for patients with asthma or other bronchopathies.

7 The use of pressure containers made of metallic materials for such applicators is known. The protection against bursting and/or shattering in pressure containers of this type is achieved by means of the properties of the selected material that are advantageous in this regard (high toughness, high strength).

8 A disadvantage of these metallic pressure containers, however, is that the nontransparent pressure container makes it impossible to visually determine how much of the substance to be released remains inside. This is a particular disadvantage when it comes to dispensing inhalants that often have the character of an emergency remedy (e.g., asthma preparations). Without a visual check, the risk exists that the pressure container could be empty when an emergency arises.

9 Additionally, a pressure container in the form of a small glass bottle ~~bottles~~ was made known in DE-AS 11 08 383. The capacity of the small glass bottle can be 5 to 50 ml. The release opening is located on the top end of the bottle. This is usually closed by inserting the delivery element, e.g., a metering valve having a usually cylindrical cannula projecting upward, into the pressure container or crimping it on the pressure container, often using an elastic seal between head and metering valve. The pressure container is thereby subjected to a relatively high internal pressure.

10 The known pressure container made of glass is covered with a coating of a transparent plastic that is sprayed on or applied via immersion, with the exception of the rim, to which the metering valve is crimped. This coating comprises a flexible soft plastic, e.g., PVC, having a great ability to stretch or expand ~~high expansion~~. The great expandability ~~high expansion~~ is important, because, if the glass container bursts, the high internal pressure acts on the soft plastic. If the soft plastic of the coating could ~~would not yield to the high pressure by deformation~~ ~~be able to [words missing] by means of a deformation of the coating,~~ e.g., by a volume change of the coating jacket ~~means of [words missing]~~, a sudden destruction of the soft plastic resulting from chemical attack would be expected.

11 Since the pressure container is comprised of a transparent material (glass) and the plastic sheathing is transparent, this known pressure container has the advantage that it makes it possible to visually determine how much of the substance to be released remains inside.

12 A disadvantage of the known pressure container, however, is the fact that the transparent pressure container made of glass -- despite its plastic coating -- is not safe enough in case of explosion, e.g., caused by improper handling, because a coating is not applied in the region of the metering valve, or because, generally speaking, if bursting occurs, the plastic sheathing can expand and burst like a balloon, which causes parts of the glass container to spray rapidly into the surroundings, including the metering valve in particular, which can come loose from the rim to which it was crimped.

13 ~~During~~ Within the framework of the production of the final pressure container, the plastic layer that provides protection against bursting and shattering is applied directly to the glass pressure container in the simplest fashion possible -- i.e., not by means of immersion or spraying -- by coating this with an extruded plastic in a molding die. A concept of this type was made known in FR 2 631 581 B1. This publication describes a small glass bottle having a tapered neck section that can be filled under pressure with a substance sprayable as aerosol and a propellant, the opening of which is closeable using a delivery element, and that comprises a plastic coating applied by injection molding.

14 In the known case, the glass pressure container comprises a small bottle having a cylindrical neck section, and the molding die is designed so that a plastic coating is also applied by injection molding to the neck section flush with the opening of the small bottle. When the neck section of the small glass bottle is designed in this fashion, however, attachment of the delivery element -- the metering valve -- is not without problems. Furthermore, the plastic coating coats

the small glass bottle completely. If bursting occurs, the coating can partly expand and burst and therefore lose its property of providing protection against bursting and shattering. The aforementioned publication furthermore makes no statement about the type of plastic material; it is therefore not considered to be essential in terms of function.

15 A further example of the aforementioned concept was made known in DE 196 32 664 A1. It discloses a small glass bottle having a tapered neck section that is fillable under pressure with a substance sprayable as aerosol and a propellant, the opening of which is closeable using a delivery element, that comprises a plastic coating applied by injection molding, and that is designed so that a secure attachment of the delivery element and a reduction of the wall thickness of the small glass bottle is possible and, on the other hand, the protection against bursting and shattering is increased considerably compared to the container made known in the FR publication. This known small bottle also comprises the following features:

- the neck section comprises a sealing rim designed in the shape of a bead on the side where the opening is located for the mechanical attachment of the delivery element, which also comprises a plastic coating applied by injection molding,
- a plurality of pressure-compensating openings designed in the shape of holes is formed in the plastic coating of the glass body applied by injection molding,

- the coating is composed of an elastic plastic material having distinct shrinkage, and it is shrunk on the small glass bottle.

16 Due to the sealing rim designed in the shape of a bead, a secure and permanent mechanical attachment of the delivery element is possible. Since the plastic coating also covers the glass sealing rim, the delivery element is still held mechanically even if the glass body bursts, which increases the protection against bursting. The pressure-compensating openings prevent the plastic coating from expanding and bursting, which also greatly increases the protection against bursting and shattering.

17 If bursting occurs, the filled substance and the propellant can escape through these pressure-compensating openings. Furthermore, due to the fact that the contents of the glass container can escape, the risk that the filled substance will chemically attack the coating material, e.g., by means of stress corrosion cracking, is further reduced, which further reduces the risk of bursting.

18 By using an elastic plastic material having distinct shrinkage, it was found that the ability of the small glass bottle coated by injection molding to be pressure-loaded is higher than the ability of the pure glass bottle to be pressure-loaded, by many times over. This effect makes a thinner wall thickness of the small glass bottle possible. The elasticity of the plastic material thereby offsets the shrinkage.

19 The present invention described hereinbelow is based on a glass container of this type.

20 In the known case, specially designed small glass bottles, "glass inlets", are coated with a transparent plastic using the conventional injection-molding

system. Since relatively viscous thermoplastics are typically used as plastic material in the conventional injection-molding system, very high injection pressures (approx. 300 bar) occur during injection molding, which can easily destroy the glass inlet. This destruction results in a high percentage of waste. Additionally, the productivity of a manufacturing system is greatly reduced. For this reason, limits are also placed on the reduction of the wall thickness of the glass inlets. The same applies for inlets made of a thermolabile plastic, especially a thermoplastic material.

21 Moreover, the known glass containers comprising a coating applied by injection molding cannot be sterilized by means of autoclaving using superheated steam at 121° C for a period of 20 minutes. A sterilization method of this type is typically required for containers used for medical purposes, however.

SUMMARY OF THE INVENTION

22 It is an object of the present invention to provide a ~~The invention is based on the object of developing the closeable glass container of the type initially described above or a thermolabile plastic container,~~ which comprises a plastic coating applied by injection molding, and to carry out the method for its production in such a fashion that, despite the thin walls of the glass container or the thermolabile plastic container, it is possible to considerably reduce the waste produced during injection molding ~~considerably, and the,~~

23 It is also an object of the present invention to provide glass containers with comprising a coating applied by injection molding, which can be subjected to high temperatures, e.g., during sterilization using superheated steam.

~~This object is successfully attained according to the invention with regard for the closeable glass container by the fact that the plastic coating comprises at least one reactively vulcanizing plastic able to be heat softened, and it is applied in the process of injection molding using the reactive injection molding technique.~~

24 These objects are successfully attained by a closeable container, which comprises a glass bottle or a thermolabile plastic bottle and a plastic coating encasing the closeable glass bottle or the thermolabile plastic bottle, wherein the plastic coating comprises a reactively cross-linkable plastic able to be heat-softened, which is applied to the bottle by a reaction injection molding (RIM) method.

25 With regard for the method for the production of ~~this glass container glass~~ containers designed as small glass bottles or glass inlets and having a plastic coating applied by injection molding designed as small glass bottles, the object is successfully attained by a method according to the invention comprising using the steps of:

- Production of the entire small glass bottle or glass inlet having base section, cylindrical jacket section, tapered neck section including sealing rim designed in the shape of a bead, according to conventional glass technology, and then

- Coating of the entire small glass bottle or inlet by injection molding in a mold using at least one ~~reactively vulcanizing~~ reactively cross-linkable plastic capable of being heat-softened, using the ~~reactive injection reaction~~ injection molding (RIM) system.

26 When the ~~reactive injection~~ reaction injection molding system (RIM system) is used according to the invention, at least one ~~reactively vulcanizing~~ reactively cross-linkable plastic with low viscosity compared to polymers, e.g., a thermosetting resin, is injected in a mold around the insert -- the glass container -- at relatively low injection pressures (less than 10 bar) and relatively low mold temperatures.

27 Since only a low injection pressure is necessary, the thickness of the container walls can be reduced, while reducing waste at the same time. Moreover, the ~~reactively vulcanizing~~ reactively cross-linkable plastics used are able to be subjected to higher temperatures than the thermoplastics typically used in the conventional injection molding system, such as PP, PE, PET, PS, as a result of which the containers comprising a plastic coating applied by injection molding are capable of being sterilized in autoclaves using superheated steam. The low mold temperatures also make it fundamentally possible to use inlets made of a thermolabile plastic.

28 Particular advantages are achieved according to one embodiment of the invention using a container developed as a small glass bottle that is capable of being filled under pressure with a substance sprayable as aerosol and a propellant, that comprises a tapered neck section having a sealing rim designed in

the shape of a bead integrally molded on the side where the container opening is located for the mechanical attachment of a delivery element, by means of which the opening of the small glass container is closeable, and that is encased in the plastic coating in such a fashion that the plastic coating also encases the sealing rim designed in the shape of a bead. Small glass bottles of this type come onto the market in various stages of development. In the basic form, the small glass bottle is supplied without a delivery element installed. A commercial form having a delivery element installed is also feasible. The small glass bottle can thereby be filled or unfilled. All of these commercial forms use the small bottle according to the invention, however, and are therefore included in the scope of protection.

29 By using the RIM method, the entire production process used to manufacture the coated container – which is fillable under pressure with a substance sprayable as aerosol and a propellant (“aerosol containers”) – can be simplified as well. The following possibilities result, for example:

30 By introducing different materials at different points in the mold, the material hardness can be increased specifically in the region of the container head in order to improve the quality of the crimping with a metering valve. The material properties in the jacket of the container can be optimized in terms of “binding splinters together”.

31 Using the RIM method, it is also possible to cover containers with a plastic sheathing after they have been closed with a valve. This becomes possible because the mold temperatures in the RIM method can be a great deal lower than in the conventional injection-molding system and, within the framework of the RIM

system, the valve cannot be damaged by temperatures that are too high.

Additionally, the mechanical forces associated with injection are lower, which also reduces the likelihood of valve damage.

32 Due to the lower mechanical load during coating, the use of the RIM method also makes it possible to use thinner glass inlets with wall thicknesses in the range of 0.7 - 1 mm with plastic sheathing strengths in the range of 1- 2 mm, so that compressed-gas packages can be produced specifically for use in application devices (injection pen systems, for example) using this method.

33 Coating can also be carried out more economically using the RIM method. On the one hand, faster process times are possible, which increases throughput. On the other hand, the molds are less expensive, which also results in an economical production of small item counts.

34 It was determined, surprisingly, that the use of reactive polyurethane systems in the RIM method eliminates the need to pretreat the outer surface of the glass inlet to achieve optimal protection against splintering.

35 When using thermoplastics that are applied in the conventional injection molding system, it must be ensured by means of separate process steps, for example, that -- as described in the cited publication DE 196 32 664 A1 -- the bond between plastic and glass surface is very weak, so that, if the container breaks, cracks in the glass inlet cannot spread into the plastic sheathing. When using reactive polyurethane systems according to the RIM method, the splinter-binding effect is independent of the load-bearing capacity of the bond between

glass and plastic sheathing, so that previously-named process steps can be eliminated.

36 Using the RIM method, components that may be mechanically and thermally loaded only minimally can be coated by injection molding. This results in further possibilities for the production of compressed-gas packages for application systems.

37 Aerosol containers, a preferred application of the container according to the invention, typically have the shape of a small glass bottle having a volume between 5 ml and 125 ml.

38 Using the RIM method, it is also possible to coat glass containers having a volume of more than 125 ml and up to 2000 ml.

39 As a result, these containers can fulfill TRG 300 requirements for compressed-gas packages.

40 As a result of the measures according to the invention, it becomes possible to produce containers in which fluids contained therein can be safely sterilized using superheated steam (at 121° C or 134° C). Under these sterilization conditions, high pressures are produced in the closed vessel that, alone, would lead to the destruction of the vessel.

41 Current glass laboratory bottles may therefore not be closed tightly when undergoing such a sterilization process, so that pressure compensation can take place. The plastic sheathing applied using the RIM method makes it possible, however, to optimize the glass inlet in terms of resistance to excess pressure and, in practical usage, it ensures safety if glass breaks.

42 Moreover, thermolabile inlets (thermoplastics, for example) are able to be coated.

43 The ~~reactive injection~~ reaction injection molding method itself is known. It is described in the following book, for instance:

"Saschtiing, Hansjürgen. Kunststoff Taschenbuch,

[*Plastics Handbook*] 24th Ed., published by Carl Hanser Verlag, Munich,

Vienna, 1989, ISBN 3-446-1 5385-394".

44 Various method variants are known.

45 Polyurethane, polyamine, and polyurea systems, and reactive ~~thermosetting~~ resins, are known in particular as ~~reactively vulcanizing~~ reactively cross-linkable plastics. Reference is made to the following book:

"Domininghaus, Hans. Die Kunststoffe und ihre Eigenschaften, [*Plastics and Their Properties*] 4th Ed., published by VDI-Verlag GmbH, Düsseldorf, 1992" for details.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

46 The objects, features and advantages of the invention will now be illustrated in more detail with the aid of the following description of the preferred embodiments, with reference to the accompanying figures in which:

Figure 1 is a partially side elevational, partially cross-sectional view of a glass container coated with a plastic coating in accordance with a first embodiment of the invention;

Figure 2 is a partially side elevational, partially cross-sectional view of a glass container coated with a plastic coating in accordance with a second embodiment of the invention;

Figure 3 is a partially side elevational, partially cross-sectional view of a glass container coated with a plastic coating in accordance with a third embodiment of the invention;

Figure 4 is a partially side elevational, partially cross-sectional view of a glass container coated with a plastic coating in accordance with additional embodiments of the invention;

Figure 5 is a partially side elevational, partially cross-sectional view of a thermolabile plastic container coated with a plastic coating in accordance with the invention; and

Figure 6 is a cross-sectional view through a mold with a glass inlet during one stage of the reaction injection mold method of making the closeable container according to the invention.

DETAILED DESCRIPTION OF THE INVENTION

47 The glass containers covered by injection molding – glass inlets – described are used preferably in the medical field. They can comprise various configurations. For instance, Figure 1 shows a partial longitudinal sectional, partial side view of a glass inlet 10 that is fillable with a medically effective substance sprayable as aerosol. A discharge opening or mouth M having a crimp or sealing

rim 2 is formed on the container ~~sheathing~~ wall 1, to which a metering valve, i. e. a delivery element, can be attached. The sealing rim 2 is connected to the body of the glass inlet 10 via a neck section 7. The base section 3 bulges distinctly in the edge region 3a, but has ~~having a~~ flat center section 3b with a relatively small surface.

48 A plastic coating 4 -- which is shown in Figure 1 in an enlarged dimension and not in entirety -- is applied to the glass inlet 10 by a method according to the ~~reactive injection~~ reaction injection molding system. The plastic coating 4 is applied in the base section 3 in such a fashion that a flat standing surface 9 is produced over the cross-section of the glass container 10. In the upper section of the container, the coating extends to the sealing rim 2 of the discharge opening M, i.e., it includes the crimp rim 2. Due to the lower mold temperatures in the ~~reactive injection~~ reaction injection molding method, however, the metering valve can also be placed on the crimp rim 2 before the coating is applied.

49 Additional embodiments of the closeable containers according to the invention are shown in Figs. 2 to 5. Parts which are the same in the different embodiments are given the same reference number.

50 In another embodiment shown in Fig. 2 Preferably, however, the glass inlets 10 are provided with a base section 3' that bulges outward in entirety, as shown in Figure 2, because they can then withstand higher internal pressures.

51 The following relationship preferably exists for the base radius R , the container diameter D , and the dimension S of the outward bulge (shown in Fig. 2):

| | Min | Max |
|---|------|-------|
| S | 1 mm | $D/2$ |
| R | 5 mm | $D/2$ |

52 Otherwise, the glass inlet according to Figure 2 is designed analogous in shape to the glass inlet according to Figure 1. ~~Identical reference numerals are used for this reason.~~

53 In the embodiments shown in figs. 1 to 4 the glass inlets can have a container wall thickness, t_g , of 0.7 to 1 mm, and a plastic coating thickness, t_p , of 1 to 2 mm.

54 Instead of a crimp rim, the glass inlets can also comprise a DIN glass thread GL 45 K for a screw-in stopper.

55 The embodiment of Fig. 3 is the same as the embodiment of Fig. 1, except that four through-going openings O are provided in the plastic coating 4 in the vicinity of the base section 3. These openings are arranged around the container in opposing pairs. These openings O have been described above. In the event that the glass inlet 10 bursts substance and propellant can escape through the openings O and thus ballooning of the plastic coating and subsequent bursting of it may be avoided.

56 Fig. 4 illustrates several embodiments similar to fig. 1. In some embodiments several different types of reactively cross-linkable plastics can be used to encase different regions or sections of the glass container 10. The same plastic coating 4 is provided in the base section 3 as in the case of Fig. 1, except that it is reinforced with fibers 41. However in one embodiment a different plastic coating 4' made with a different reactively cross-linkable plastic can be provided in the vicinity of the sealing rim 2 and neck section 7 than in the base section 3. The plastic coating 4' can be harder than the plastic coating 4 and have other different properties. It also can have a different coating thickness t'_p . In an alternative embodiment the body of the glass container 10 can have a multilayer plastic coating 4,4' comprising a plastic layer 4' and 4'' made with different reactively cross-linkable plastics.

57 The RIM method is especially valuable to provide a plastic coating on a thermolabile plastic inlet 110, such as shown in Fig. 5, because of the comparatively low injection molding pressures and temperatures used in the RIM system, as mentioned in the above "summary of invention" section. Fig. 5 shows a thermolabile plastic inlet 110 provided with a plastic coating 14 on the container wall 11 made with a reactively cross-linkable plastic material. The plastic coating 14 extends from the bottom of the base section 13 over the neck section 17 and up to and including the sealing rim 12 of the inlet 110, although Fig. 5 does not show that it extends completely up to the rim 12. The resulting closeable container has a flat base surface 19.

58 In addition to the medical field described, the glass containers can also be used to store sprayable cosmetic products and to store/prepare beverages.

The method according to the invention is also suited, therefore, to coat glass bottles for the production of carbonated mineral water when introducing CO₂ into tap water. The required pressure-loadability is thereby 12 bar, which indicates a TRG 300 test pressure of 18 bar. The volume of the bottles is typically 0.5 or 0.7 and 1.0 liter.

59 Figure 6 shows a step in the method of producing the closeable containers according to the invention, in which the glass inlet or container 10 is in a closed mold 21 surrounded by the reactively cross-linkable plastic. The mold 21 is used in the reaction injection molding method according to the invention to make the closeable container comprising the glass inlet 10 and the plastic coating 4 encasing it. The glass inlet 10 itself is made by well known methods.

REMARKS

The above substitute specification is for the U.S. National Stage of PCT/EP 00/08224, Ser. No. 10/069,645. The original English translation of the specification included several key translation errors, which made understanding of the claimed invention difficult. Also the English translation of the specification, which was originally in the German language, was not prepared in accordance with U.S. Patent Office Rules for specifications. The substitute specification has

been filed to make appropriate changes to put the specification in a form that complies with U.S. Patent Office rules.

Translation errors have been corrected. In particular the term "reactively-vulcanizing plastic" was an incorrect translation of the German term "reaktiv vernetzender Kunststoff". The correct term in English is "reactively cross-linkable or cross-linking plastic". The English language abstract provided with the copy of the PCT International application that was received from the International Bureau shows that this latter term is correct.

In addition, the term "container sheathing" on page 12 of the originally filed English translation is an inappropriate translation. This term is an English translation of the German term "Behältermantel". The German-English Technical and Engineering Dictionary by L. DeVries, et al, 2nd Edition, 1966 gives the appropriate translation of this term under the entry for "mantel" as "container wall". The term "sheathing" is appropriate for an outer jacket of a cable or perhaps for the plastic coating on the small glass bottle or "glass inlet" but not for a container wall.

The term "thermosetting resins" on page 11, line 27, of the originally filed specification was also a mistranslation. The correct term is "reactive resins". Thermosetting resins of the prior art are not to be used to make the plastic coating of the invention (see paragraph 5 of the background section of the specification).

Also other minor changes in terminology were made, which are not "new matter". The words that were missing in the English translation of the specification on page 3 were due to the fact that a sentence was cut off from that

page supplied to the translator due to a copying error. The complete official copy of the PCT publication (which was provided to the U.S.P.T.O. by the International Bureau) however provided the complete German language sentence so that an appropriate translation could be made.

In accordance with U.S. Patent Office Rules the original two drawing figures were replaced by six new drawing figures in order to illustrate features of various embodiments of the claimed containers from the original dependent claims that were not illustrated. Claims 2 to 14 provided the source of many additional features including through-going openings O in the plastic coating 4, wall thickness values, different coatings in different container sections, different coating thickness in different coating regions, fiber-reinforced coatings and coatings which are multi layer. A step in the method of making the containers is also shown in new Fig. 6. All these features are now shown and described in the detailed description section without adding new matter in the drawing because the added subject matter to the detailed description was in the original dependent claims or in the summary section.

In addition a brief description of the new figures has been added, which does not include new matter.

The above marked-up copy of the originally filed specification shows the changes that were made to obtain the substitute specification filed in the accompanying amendment. This marked-up copy is filed under M.P.E.P. 608.01 (q). The above substitute specification is warranted to contain no new matter.

Underlining shows additions, strikethrough shows deletions.

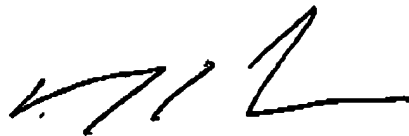
Changes were also made to add recommended section headings in accordance with U.S. Patent Practice. References to claims by number were replaced by the subject matter of the claim. In addition, minor informalities in the English translation were corrected.

The specification paragraphs are numbered in accordance with the rules.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549-700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,



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